



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

20306

7590

06/02/2009

MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP
300 S. WACKER DRIVE
32ND FLOOR
CHICAGO, IL 60606

EXAMINER

AZARIAN, SEYED H

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 06/02/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,140	05/17/2005	Christelle Marie Guittet	05-367	3587

TITLE OF INVENTION: MEASUREMENT OF MITOTIC ACTIVITY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	09/02/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

20306 7590 06/02/2009

MCDONNELL BOEHNNEN HULBERT & BERGHOFF LLP
300 S. WACKER DRIVE
32ND FLOOR
CHICAGO, IL 60606

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,140	05/17/2005	Christelle Marie Guittet	05-367	3587

TITLE OF INVENTION: MEASUREMENT OF MITOTIC ACTIVITY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	09/02/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
AZARIAN, SEYED H	2624	382-128000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/535,140

05/17/2005

Christelle Marie Guittet

05-367

3587

20306

7590

06/02/2009

EXAMINER

AZARIAN, SEYED H

MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP
300 S. WACKER DRIVE
32ND FLOOR
CHICAGO, IL 60606

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 06/02/2009

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 607 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 607 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/535,140

Applicant(s)

GUITTET ET AL.

Examiner

Seyed Azarian

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 4/16/2009 and telephone interview filed on May 26, 2009.
2. ☒ The allowed claim(s) is/are 1-34.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 9/24/08&8/18/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date ____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other ____.

/Seyed Azarian/
Primary Examiner, Art Unit 2624

Response to Amendment

1. Based on applicant's amendment, filed 4/16/2009, see page 13 through 19 of the remarks, also telephone interview filed on May 26, 2009, with respect to amended claims 1, 10 and 11, have been fully considered and are persuasive, upon further consideration the 35 USC 101 rejection and rejection of 103(a) for claims 1-34, are hereby withdrawn.

The claims 1-34 are allowed.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it must be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Applicants Attorney (Mr. A Blair Hughes, Reg No. 32,901), on May 26, 2009, without traverse.

The amended claims 1, 10 and 11 as follows:

Claim 1. (Currently Amended) A method of measurement of mitotic activity from histopathological specimen image data, the method comprising the steps of:

- a) identifying pixels in the image data having luminances associated with mitotic figures;
- b) selecting from among the identified pixels a reference pixel which is sufficiently close in position and luminance to another identified pixel to provide a reference colour;

- c) locating pixels in the image data with luminances sufficiently close to that of the reference colour to indicate potentially mitotic figures;
- d) incrementing image regions corresponding to potentially mitotic figures from the located pixels by adding pixels thereto, potential increments to image regions being implemented or rejected by according to whether or not their luminances are sufficiently close to respective image region luminances and sufficiently far from an image data background luminance;
- e) selecting grown image regions on the basis of thresholds for image region area, compactness and width/height ratio; and
- f) counting selected grown image regions as actually indicating mitotic figures on the basis of thresholds for number of such regions;
wherein the method is implemented by a processor.

Claim 10. (Currently Amended) A method of measuring mitotic activity from histopathological specimen color image data, the method having the steps of:

- a) staining a histopathological specimen with a staining agent to color and delineate tissue and cellular structure appropriately for assessment of mitotic activity,
- b) obtaining color image data from the staining of the stained histopathological specimen,

Wherein the steps c-g are implemented by a processor;

- c) measuring an intensity profile of an image region in the color image data,
the image region corresponding to a potentially mitotic figure, ~~and~~

- d) counting the image region as indicating a mitotic figure if its intensity profile has a value non-zero number of pixels with intensity associated with mitotic figure imagery, and that pixel number is greater than a prearranged threshold value, at a position in the profile having intensity associated with mitotic figure imagery.
- e) if one or more other image regions corresponding to potentially mitotic figures are available in the specimen image, repeating steps c) and d) for such region or regions,
- f) repeating steps c), d) and e) for additional histopathological specimen image data in order to obtain mitotic figure counts for a plurality of specimen images, and
- g) summing the mitotic figure counts obtained in steps c) to f) to provide an indication of degree of mitotic activity.

Claim 11. (Currently Amended) A method of measuring mitotic activity from histopathological specimen image data, the method having the steps of:

- a) measuring an intensity profile of an image region corresponding to a potentially mitotic figure, and
- b) counting the image region as indicating a mitotic figure if its profile has a first value not greater than the prearranged threshold at a position in the profile having intensity associated with mitotic figure imagery, a second value greater than a prearranged second threshold, a third value greater

than a prearranged third threshold, and a minimum value less than a prearranged fourth threshold;

wherein the method is implemented by a processor.

REASONS FOR ALLOWANCE

3. The following is an examiner's statement of reasons for allowance.

This invention relates generally, to a method, an apparatus and a computer program for measurement of mitotic activity, which indicates cell division taking place in a tissue specimen: it is particularly relevant to making measurements on potentially cancerous tissue such as breast cancer tissue. The method is also relevant to other forms of cancer such as colon and cervical cancer.

Based on applicant's amendment, with respect to claim 1 representative of claims 17 and 27, the closest prior art of record (Vaisberg and Sundbland), Vaisberg reference is directed to image analysis methods used to classify cells based upon their state in the cell growth and division cycle. Sundbland reference is directed to methodology for determination of mitotic index (MI) from apical meristems of conifers was improved to permit the efficient processing of large sample numbers. But neither Vaisberg nor Sundbland disclose or suggest, among other things, "selecting from among the identified pixels a reference pixel which is sufficiently close in position and luminance to another identified pixel to provide a reference colour, locating pixels in the image data with luminance's sufficiently close to that of the reference colour to indicate potentially mitotic figures, incrementing image regions corresponding to potentially mitotic figures from the located pixels by adding pixels thereto, potential increments to image regions being implemented or rejected by according to whether or not their luminance's are sufficiently close to respective image region luminance's and sufficiently far from an image data background luminance, and selecting grown image regions on the basis of thresholds for image region area,

compactness and width/height ratio, counting selected grown image regions as actually indicating mitotic figures on the basis of a threshold for number of such regions”.

Additionally claim 10 representative of claims 23 and 31, the closest prior art of record (Vaisberg and Sundbland) does not teach or suggest, among other things, “ staining a histopathological specimen with a staining agent to color and delineate tissue and cellular structure appropriately for assessment of mitotic activity, obtaining color image data from the staining of the stained histopathological specimen, measuring an intensity profile of an image region in the color image data, the image region corresponding to a potentially mitotic figure, counting the image region as indicating a mitotic figure if its intensity profile has a value non-zero number of pixels with intensity associated with mitotic figure imagery, and that pixel number is greater than a prearranged threshold value, if one or more other mare regions corresponding to potentially mitotic figures are available in the specimen image, repeating steps c) and d) for such region or regions, repeating steps c), d) and e) for additional histopathological specimen mage data in order to obtain mitotic figure counts for a plurality of specimen mares, and summing the mitotic figure counts obtained in steps c) to f) to provide an indication of degree of mitotic activity”.

Finally claim 11 representative of claims 24 and 32, the closest prior art of record (Vaisberg and Sundbland) does not teach or suggest, among other things, “measuring an intensity profile of an image region corresponding to a potentially mitotic figure, and b) counting the image region as indicating a mitotic figure if its profile has a first value not greater than the prearranged threshold at a position in the profile having intensity associated with mitotic figure imagery, a second value greater than a prearranged second threshold, a third value greater than a prearranged third threshold, and a minimum value less than a prearranged fourth threshold”.

These key features in combination with the other features of the claimed invention are neither taught nor suggested by (Vaisberg and Sundbland) prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (571) 272-7443. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR. Status information about the PAIR system, see [http:// pair-direct.uspto.gov](http://pair-direct.uspto.gov). Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Seyed Azarian/

Primary Examiner, Art Unit 2624

May 27, 2009